

a rotor core comprising a plurality of rotor laminations, each of said laminations having an outer periphery, a first set of rotor laminations comprising a plurality of slots having skew portions extending in a first direction, a second set of said rotor laminations comprising a plurality of slots having skew portions extending in a second direction, a plurality of notches having an open end at said outer periphery and substantially aligned and coextensive with at least one said skew portions, and a central rotor shaft opening;

AS a rotor shaft having an axis which is coaxial with a rotor core axis of rotation and extending through said central rotor shaft opening;

a plurality of secondary conductors extending through said slots; and

a plurality of permanent magnets located in said lamination notches.

AC 21. (once amended) An electric motor, comprising:

a stator comprising a stator core, first and second main windings, said first main winding configured to form a lower number of poles than said second main winding, said stator core forming a stator bore; and

a rotor core comprising a plurality of rotor laminations, each of said laminations having an outer periphery, a first set of rotor laminations comprising a plurality of slots having skew portions extending in a first direction, a second set of rotor laminations comprising a plurality of slots having skew portions extending in a second direction, a plurality of notches having an open end at said outer periphery and substantially aligned and coextensive with at least one of said skew portions, a plurality of secondary conductors extending through said slots, and a plurality of permanent magnets located in said lamination notches and magnetized to form a number of poles equal to the number of poles formed by said second main winding.

Remarks

The Office Action mailed June 5, 2002 has been carefully reviewed and the foregoing amendment has been made in consequence thereof. Submitted herewith is a Submission of Marked Up Paragraphs and Claims, and a Request for Approval of Drawings Changes.

Claims 1-23 are now pending in this application. Claims 1-23 stand rejected.

Applicants note the objections to the drawings. Specifically, Figure 15 has been amended to add a legend Prior Art. Applicants respectfully request approval of the indicated

drawing change in red ink. Upon approval of the drawing change, Applicants will submit substitute drawings incorporating the above-noted changes. For the reasons set forth above, Applicants request that the objections to the drawings be withdrawn.

Applicants respectfully traverse the objection to the disclosure. Specifically, on page 4, line 7, the description of Figure 4 has been amended to correctly refer to Figure 3. For the reasons set forth above, Applicants request that the objection to the disclosure be withdrawn.

The objection to the title of the invention as non-descriptive of the invention is respectfully traversed. Specifically, although Applicants respectfully submit that the originally submitted title of the invention clearly describes the claimed invention, in an effort to expedite the prosecution of this application, Applicants have amended the title of the invention. Accordingly, Applicants respectfully request that the objection to the title of the invention be withdrawn.

The rejection of Claim 8 under 35 U.S.C. § 112, second paragraph is respectfully traversed. Specifically, Claim 8 has been amended to recite "wherein at least one of said notches has a rectangular cross sectional shape." For the reasons set forth above, Applicants respectfully request that the Section 112 rejections of Claim 8 be withdrawn.

The rejection of Claims 1-4, 6, 8-12, and 14-23 under 35 U.S.C. § 103 as being unpatentable over Hibino et al. ("Hibino") (US 5,182,483) in view of Berger (US 5,637,943) is respectfully traversed.

Hibino describes a squirrel cage rotor including a rotor core formed by laminating a plurality of steel sheets (1). A first set of laminations are inclined to the left, and a second set of laminations are inclined to the right. The steel sheets have punched portions (2) for forming equally spaced slots (3) along the outer circumference. The steel sheets are laminated such that the punched slots are skewed and the slots axially pass through the rotor core.

Berger describes a squirrel-cage that includes a groove cross section (4) divided in a radial direction into four groove zones (5). The groove zones are alternately displaced in and against the direction of the rotation of the rotor. Each groove zone includes at least one protuberance (7) and at least one bulge (8), positioned such that at least one protuberance and at least one bulge located in laterally opposed groove walls. The protuberances and the bulges have a similar shape and size.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Hibino nor Berger, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Hibino with Berger, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one skilled in the art at the time the invention was made to use the notched laminations disclosed by Berger on the core disclosed by Hibino for the purpose of producing a groove shape for a squirrel-cage rotor which retains the conductor rod in a fixed position and thereby prohibits, with certainty, any imbalancing" suggests combining the disclosures.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present

invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

Further, and to the extent understood, neither Hibino nor Berger, considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 has been amended and recites "a first set of rotor laminations comprising a plurality of slots having skew portions extending in a first direction, a second set of said rotor laminations comprising a plurality of slots having skew portions extending in a second direction, and a plurality of notches having an open end at said outer periphery and substantially aligned and coextensive with at least one of said skew portions."

Neither Hibino nor Berger, considered alone or in combination, describe nor suggest a rotor core having a plurality of notches substantially aligned and coextensive with at least one skew portion wherein the notches have an open end at the outer periphery and are substantially aligned and coextensive with at least one skew portion. Rather, Hibino describes a squirrel cage rotor including a rotor core formed by laminating a plurality of steel sheets that include punched slots that are skewed and the slots axially pass through the rotor core, and Berger describes a squirrel-cage that includes a groove cross section that is alternately displaced in and against the direction of the rotation of the rotor. For at least the reasons set forth above, Claim 1 is submitted to be patentable over Hibino in view of Berger.

Claims 2-4, 6, and 8-12 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 2-4, 6, and 8-12 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2-4, 6, and 8-12 likewise are patentable over Hibino in view of Berger.

Claim 14 recites "a rotor core comprising a plurality of rotor laminations, each of said laminations having an outer periphery, a first set of rotor laminations comprising a plurality of slots having skew portions extending in a first direction, a second set of said rotor laminations comprising a plurality of slots having skew portions extending in a second direction, a plurality of notches having an open end at said outer periphery and substantially aligned and coextensive with at least one said skew portions ... [and] a plurality of permanent magnets located in said lamination notches."

Neither Hibino nor Berger, considered alone or in combination, describe nor suggest a rotor core having a plurality of notches substantially aligned and coextensive with at least one

skew portion wherein the notches have an open end at the outer periphery and are substantially aligned and coextensive with at least one skew portion. Rather, Hibino describes a squirrel cage rotor including a rotor core formed by laminating a plurality of steel sheets that include punched slots that are skewed and the slots axially pass through the rotor core, and Berger describes a squirrel-cage that includes a groove cross section that is alternately displaced in and against the direction of the rotation of the rotor. For at least the reasons set forth above, Claim 14 is submitted to be patentable over Hibino in view of Berger.

Claims 15-19 depend, directly or indirectly, from independent Claim 14. When the recitations of Claims 15-19 are considered in combination with the recitations of Claim 14, Applicants submit that dependent Claims 15-19 likewise are patentable over Hibino in view of Berger.

Claim 21 recites "[a]n electric motor, comprising ... a rotor core comprising a plurality of rotor laminations, each of said laminations having an outer periphery, a first set of rotor laminations comprising a plurality of slots having skew portions extending in a first direction, a second set of rotor laminations comprising a plurality of slots having skew portions extending in a second direction, a plurality of notches having an open end at said outer periphery and substantially aligned and coextensive with at least one of said skew portions...and a plurality of permanent magnets located in said lamination notches...."

Neither Hibino nor Berger, considered alone or in combination, describe nor suggest an electric motor including a rotor core containing a plurality of notches substantially aligned and coextensive with at least one skew portion wherein the notches have an open end at the outer periphery and are substantially aligned and coextensive with at least one skew portion. Rather, Hibino describes a squirrel cage rotor including a rotor core formed by laminating a plurality of steel sheets that include punched slots that are skewed and the slots axially pass through the rotor core, and Berger describes a squirrel-cage that includes a groove cross section that is alternately displaced in and against the direction of the rotation of the rotor. For at least the reasons set forth above, Claim 21 is submitted to be patentable over Hibino in view of Berger.

Claims 22-23 depend, directly or indirectly, from independent Claim 21. When the recitations of Claims 22-23 are considered in combination with the recitations of Claim 21, Applicants submit that dependent Claims 22-23 likewise are patentable over Hibino in view of Berger.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1-4, 6, 8-12, and 14-23 be withdrawn.

The rejection of Claims 5 and 7 under 35 U.S.C. § 103 as being unpatentable over Hibino et al. ("Hibino") (US 5,182,483) in view of Berger (US 5,637,943) as applied to Claims 1-4, 6, 8-12, and 14-23 and in further view of Pielok (US 6,369,686) is respectfully traversed.

Hibino and Berger are described above. Pielok describes a resolver that includes a first and a second winding core (2 and 4, respectively), that each include a first and a second set of core plates (3 and 6, respectively), that are laminated and include a plurality of winding spaces (7 and 9, respectively) with winding openings (8 and 10, respectively). A primary winding wire is wound on the first winding core, wherein the winding openings of the first set of core plates are larger in diameter than the diameter of the primary winding wire. A secondary winding wire is wound on the second winding core, wherein the winding openings of the second set of core plates are larger in diameter than the diameter of the secondary winding wire. The first set of core plates are rotated with respect to each other in such a way that the remaining total winding opening of the first winding is less than the diameter of the primary winding wire.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Hibino, Berger, or Pielok, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Hibino with Berger and Pielok, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one skilled in the art at the time the invention was made to use the lamination configuration disclosed by Pielok on the core disclosed by Hibino in view of Berger for the purpose of providing laminations aligned in such a way that an automatic winding process can be performed through the respective winding openings" suggests combining the disclosures.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

Further, and to the extent understood, none of Hibino, Berger, or Pielok, considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 has been amended and recites "a first set of rotor laminations comprising a plurality of slots having skew portions extending in a first direction, a second set of said rotor laminations comprising a plurality of slots having skew portions extending in a second direction, and a plurality of notches having an open end at said outer periphery and substantially aligned and coextensive with at least one of said skew portions."

None of Hibino, Berger, or Pielok, considered alone or in combination, describe nor suggest a rotor core having a plurality of notches substantially aligned and coextensive with at least one skew portion wherein the notches have an open end at the outer periphery and are substantially aligned and coextensive with at least one skew portion. Rather, Hibino describes a squirrel cage rotor including a rotor core formed by laminating a plurality of steel

sheets that include punched slots that are skewed and the slots axially pass through the rotor core, Berger describes a squirrel-cage that includes a groove cross section that is alternately displaced in and against the direction of the rotation of the rotor, and Pielok describes a resolver that includes a first and a second winding core each with a first and a second set of core plates that are laminated and have a plurality of winding spaces with winding openings. For at least the reasons set forth above, Claim 1 is submitted to be patentable over Hibino in view of Berger and Pielok.

Claims 5 and 7 depend directly from independent Claim 1. When the recitations of Claims 5 and 7 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 5 and 7 likewise are patentable over Hibino in view of Berger and Pielok.

The rejection of Claim 13 under 35 U.S.C. § 103 as being unpatentable over Hibino et al. ("Hibino") (US 5,182,483) in view of Berger (US 5,637,943) as applied to Claims 1-4, 6, 8-12, and 14-23 and in further view of Prymak (US 4,616,151) is respectfully traversed.

Hibino and Berger are described above. Prymak describes a laminated helical rotor core defining poles and axially disposed tooth portions that overlap. Each tooth portion has a primary skew because of overlap in lamination and a secondary skew caused by the tooth portions themselves. The overlap in laminations produces a helical rotor cage.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None Hibino, Berger, or Prymak, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Hibino with Berger and Prymak, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one skilled in the art at the time the invention was made to use the third set of rotor laminations disclosed by Prymak on the rotor disclosed by Hibino in view of Berger for the purpose of providing a scattering of the magnetic forces across the field and case structure in such a way as to reduce excitation of the resonant modes of the case" suggests combining the disclosures.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

Further, and to the extent understood, none Hibino, Berger, or Pryjmak, considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 has been amended and recites "a first set of rotor laminations comprising a plurality of slots having skew portions extending in a first direction, a second set of said rotor laminations comprising a plurality of slots having skew portions extending in a second direction, and a plurality of notches having an open end at said outer periphery and substantially aligned and coextensive with at least one of said skew portions."

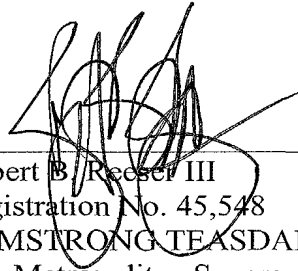
None of Hibino, Berger, or Pryjmak, considered alone or in combination, describe nor suggest a rotor core having a plurality of notches substantially aligned and coextensive with at least one skew portion wherein the notches have an open end at the outer periphery and are substantially aligned and coextensive with at least one skew portion. Rather, Hibino describes a squirrel cage rotor including a rotor core formed by laminating a

plurality of steel sheets that include punched slots that are skewed and the slots axially pass through the rotor core, Berger describes a squirrel-cage that includes a groove cross section that is alternately displaced in and against the direction of the rotation of the rotor, and Prymak describes a laminated helical rotor core defining poles and axially disposed tooth portions that overlap. For at least the reasons set forth above, Claim 1 is submitted to be patentable over Hibino in view of Berger and Prymak.

Claim 13 depends directly from independent Claim 1. When the recitations of Claim 13 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 13 likewise are patentable over Hibino in view of Berger and Prymak.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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